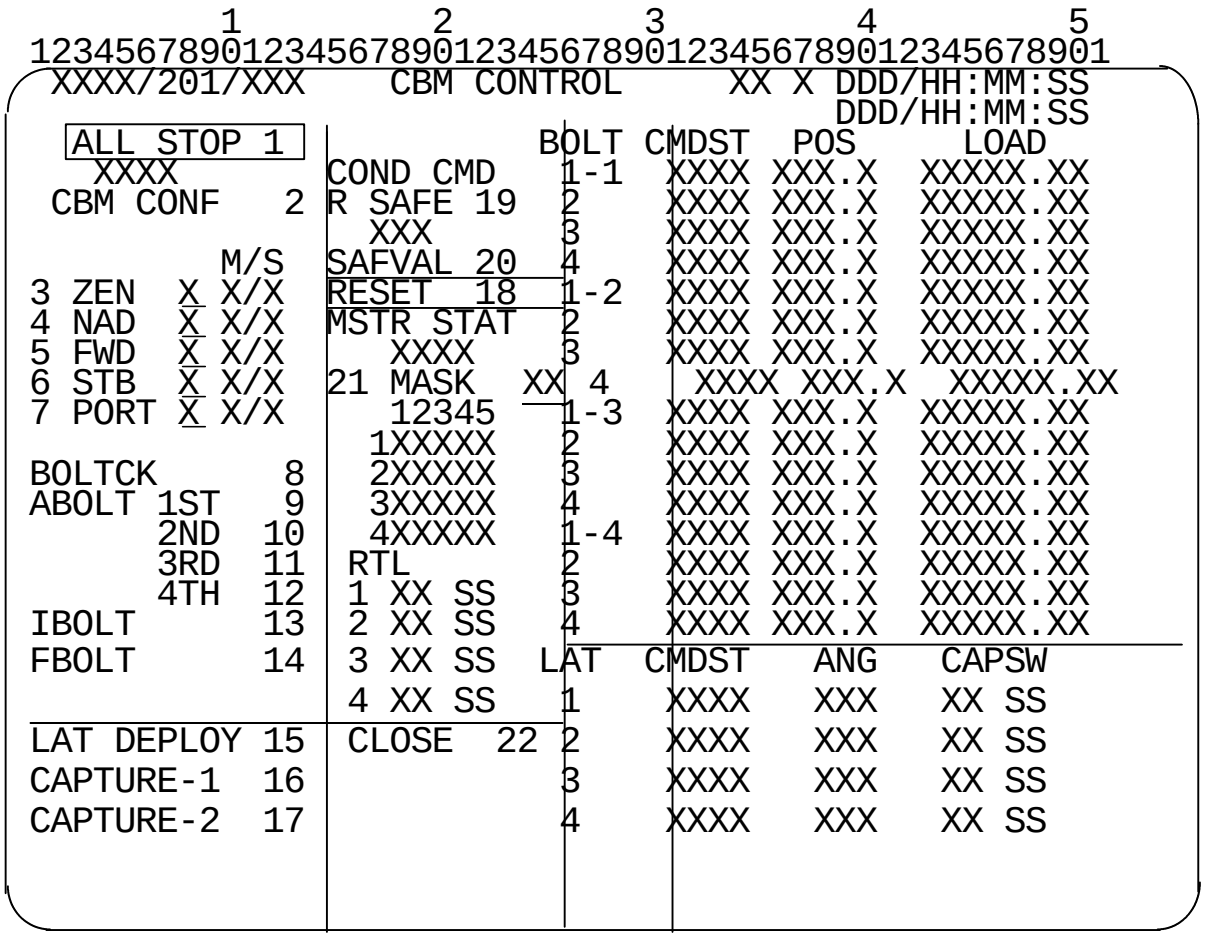
SPEC 201 CBM CONTROL DISPLAY



PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
'CONFIRMATION REQUEST' [1]	P79X0627E, P79X0628E, P79X0629E, P79X0630E, P79X0631E	----------	NONE, RSAF, UBLT, STOP, BIT, CAPT, BBLT, DBLT, ABLT, MASK, RSET, DPLY, CLOS, FBLT, IBLT, LBLT, RBLT, INIT						-----	-----
ZEN M (MONITOR FIELD)	P79X0606E, P79X0607E	----------	D = DEACTIVATED A = ACTIVATED M = MONITOR						-----	-----
ZEN S	P82K5959J, P82K5960J	----------	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						-----	-----
NAD M (MONITOR FIELD)	P79X0608E, P79X0609E	----------	D = DEACTIVATED A = ACTIVATED M = MONITOR						-----	-----
NAD S	P82K5961J, P82K5962J	----------	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						-----	-----
FWD M (MONITOR FIELD)	P79X0610E, P79X0611E	----------	D = DEACTIVATED A = ACTIVATED M = MONITOR						-----	-----

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
FWD S	P82K5967J, P82K5968J	----------	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						-----	-----
STB M (MONITOR FIELD)	P79X0612E, P79X0613E	----------	D = DEACTIVATED A = ACTIVATED M = MONITOR						-----	-----
STB S	P82K5963J, P82K5964J	----------	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						-----	-----
PORT M (MONITOR FIELD)	P79X0614E, P79X0615E	----------	D = DEACTIVATED A = ACTIVATED M = MONITOR						-----	-----
PORT S	P82K5965J, P82K5966J	----------	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						-----	-----
MSTR STAT	P79X0091E, P79X0524E, P79X0525E, P79X0526E	----------	CPLT, PROG, PEND, ABRT, FAIL, TIME						-----	-----
RTL 1	P79X0163E, P79X0164E	----------	O = OPENED C = CLOSED					↓	-----	-----

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
RTL 2	P79X0172E, P79X0173E	----------	O = OPENED C = CLOSED					↓	-----	-----
RTL 3	P79X0181E, P79X0182E	----------	O = OPENED C = CLOSED					↓	-----	-----
RTL 4	P79X0190E, P79X0191E	----------	O = OPENED C = CLOSED					↓	-----	-----
CMD STAT 1-1 [2]	P79X0059E	----------	CPLT, PROG, FAIL, BIND, INTF, STRP, NOEN, NOAD, MALF, MISS, JAMD, MSBD, ABRT						-----	-----
BOLT CMD STAT 2-1	P79X0061E								-----	-----
BOLT CMD STAT 3-1	P79X0071E								-----	-----
BOLT CMD STAT 4-1	P79X0075E								-----	-----
BOLT CMD STAT 1-2	P79X0063E								-----	-----
BOLT CMD STAT 2-2	P79X0067E								-----	-----
BOLT CMD STAT 3-2	P79X0073E								-----	-----
BOLT CMD STAT 4-2	P79X0077E								-----	-----
BOLT CMD STAT 1-3	P79X0065E								-----	-----
BOLT CMD STAT 2-3	P79X0069E								-----	-----
BOLT CMD STAT 3-3	P79X0083E								-----	-----
BOLT CMD STAT 4-3	P79X0087E								-----	-----
BOLT CMD STAT 1-4	P79X0079E								-----	-----
BOLT CMD STAT 2-4	P79X0081E								-----	-----
BOLT CMD STAT 3-4	P79X0085E								-----	-----
BOLT CMD STAT 4-4	P79X0089E								-----	-----
POSITION BOLT 1-1	79X0034A	Revs.	0 --- 51						TBD	TBD

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
POSITION BOLT 1-2	P79X0036A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 1-3	P79X0037A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 1-4	P79X0044A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-1	P79X0035A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-2	P79X0038A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-3	P79X0039A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-4	P79X0045A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-1	P79X0040A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-2	P79X0041A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-3	P79X0046A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-4	P79X0047A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-1	P79X0042A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-2	P79X0043A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-3	P79X0048A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-4	P79X0049A	Revs.	0 --- 51						TBD	TBD
BOLT LOAD 1-1	P79G0002A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 1-2	P79G0006A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 1-3	P79G0008A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 1-4	P79G0022A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-1	P79G0004A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-2	P79G0010A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-3	P79G0012A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-4	P79G0024A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 3-1	P79G0014A	POUNDS	-1 to 25,000						TBD	TBD

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
BOLT LOAD 3-2	P79G0016A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 3-3	P79G0026A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 3-4	P79G0029A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-1	P79G0042A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-2	P79G0043A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-3	P79G0048A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-4	P79G0049A	POUNDS	-1 to 25,000						TBD	TBD
LAT CMD STAT 1	P79X0093E	----------	CPLT, PROG, FAIL, BIND, INTF, STRP, NOEN, NOAD, MALF, MISS, JAMD, MSBD, ABRT						------	-------
LAT CMD STAT 2	P79X0097E								------	-------
LAT CMD STAT 3	P79X0101E								------	-------
LAT CMD STAT 4	P79X0105E								------	-------
LATCH SHAFT POSITION 1 (ANG)	P79H0051A	Revs.	0 --- 51						TBD	TBD
LATCH SHAFT POSITION 2 (ANG)	P79H0053A	Revs.	0 --- 51						TBD	TBD
LATCH SHAFT POSITION 3 (ANG)	P79H0055A	Revs.	0 --- 51						TBD	TBD
LATCH SHAFT POSITION 4 (ANG)	P79H0057A	Revs.	0 --- 51						TBD	TBD
CAP SW -1 (left)	P79X0165E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	------	-------
-1 (right)	P79X0166E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	------	-------
-2 (left)	P79X0174E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	------	-------
-2 (right)	P79X0175E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	------	-------

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
CAP SW -3 (left)	P79X0183E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	------	-------
-3 (right)	P79X0184E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	------	-------
-4 (left)	P79X0192E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	------	-------
-4 (right)	P79X0193E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	------	-------

REMARKS

[1] The four-character field below displays ‘CONF’. It is the ‘confirmation request’ field where the commanded process in work is displayed upon execution of an ‘ITEM 2 EXEC’.

[2] Bolt Command Status, Position, and Loads are to the right of each bolt. For the Command Status, each controller has a particular four-character field to denote if the command is: in progress, failed, if binding is detected, if interference is detected, if missed capture is detected, if stripping is detected, if there is a no engaged condition, if there is a not adjusted condition, if a malfunction is detected, if missing capture is detected, if a jam is detected, if a command missed a broadcast, and if a command was aborted. The user is cued from this field in the event a command has to be masked or if ground intervention is required.

Bolt position is identified to the right of the Command Stat field, and shows the progress of bolt rotation for each once commands are issued. The user can use this cue to determine if a slowdown or jam can be anticipated. This is a good bolt progress column for the user.

Bolt Load is displayed at the right of the display. With each bolt force command increasing as the sequence progresses, the crew can use this cue to determine if an I_Bolt or F_Bolt command needs to be present.

[3] For each of the four capture latches at the bottom right, similar columns provide the user with latch insight as with the bolts above. Latch command status is similar to the range of four-character fields for the bolt commands above. Latch angle shows the range of full latch extension to the retracted position.

The Capture Switch, along with the position switch, shows whether a particular latch missed the incoming passive segment. An ‘O’ or ‘C’ under the ‘CA’ of the header ‘CAPSW’ will indicate when a latch switch is open or closed. Under ‘SW’ of the header a status field will indicate if an open circuit or switch short is evident with a down arrow displayed.

ITEM ENTRY CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY

Items 1 and 2: Item 1 is an all stop command to be used in the event the crew needs to stop any controller activity that could be considered a problem. This is boxed on top as to allow rapid identification and execution. The four-character field below displays 'CONF.' It is the 'confirmation request' field where the commanded process in work is displayed upon execution of an 'ITEM 2 EXEC'. Addendum AA shows the various text feedbacks. The command is a two-step MDM software process to override the firmware command validation step or to send a command which the firmware considers non-default (nominally sent during the ABOLT command).

Below the CBM Confirm Item 2 are the CBM activation hex entries for powering up the opening desired.

Items 3 --- 7: These will be mission unique and will represent Node 1 for early assembly flights and Node 2 for the later flights. These commands will be given to the "active" side of the CBM desired usually at the node interface. 'ITEM 3+1 EXEC' will select a primary (master) controller. 'ITEM 3+2 EXEC' will select a secondary controller. In each case the index number is displayed in the hex field as a crew cue as to which was selected. This is the beginning of the nominal procedures after the power up steps. Item 3 will select the Zenith CBM items 4, 5, 6, and 7 work similarly if procedures require these to be activated.

The 'M/S' fields adjacent to the index field shows the user whether the CBM is activated, deactivated, or in the Monitor state. An 'A' is displayed if activated, a 'D' is displayed if deactivated, and an 'M' is displayed if in the monitor state. The 'S' field displays a 0, 1, 2, or 3 and shows the user if the CBM selected is using no controller, a prime controller, or a backup controller. These correspond to the activate and deactivate command.

Items 8 --- 12: The 'BOLTCK' command 'ITEM 8 EXEC' drives all 16 bolts out 2 turns and in 3 turns. This is a test of the bolt and motor operation to ensure they work as desired prior to the mating operation. The 'ITEM 9 EXEC' rotates the first group of four bolts (each 90 degrees apart) and they will drive out to acquire the passive corresponding nuts. Items 10, 11, and 12 will do the same respectively. These are the 'Acquire' or 'Abolt' commands.

Item 13: IBOLT - command continues the bolting process but takes all bolts to a higher load (automatically sequenced four at a time). Nominally, these commands will be sent several times in a row to ensure proper bolt loads are delivered.

Item 14: FBOLT - command continues the bolt torque until the bolts are taken to their final load. This command is sent several times to ensure the bolts reach their final load.

Item 15: LAT DEPLOY - command sends out the latches (4) from the retracted position in preparation to grapple the passive portion of the CBM of the component to be berthed.

Item 16: CAPTURE-1 - command moves all four capture latches in the first step of a two-step sequence, moving the latches to the 150° position.

Item 17: CAPTURE-2 - command moves all four capture latches in the first step of a two-step sequence, moving the latches to the 150° position.

Item 18: RESET - a reset command similar to that on a home computer. It allows a restart if the software sequences lock up.

Item 19: R SAFE - the Contingency Command 'ITEM 19 EXEC' which starts a sequence of three commands to start the process of CBM support of the 20 minute separation requirement for a fast getaway of the Orbiter should that become necessary. Note: the second command in this sequence is the CBM_Confirmation_Command. Upon successful completion of this event, a 'VAL' appears below item 19 prompting the operator to be sure they really want to initiate Rapid Safing.

Item 20: SAFVAL - 'ITEM 20 EXEC' is the third of three commands that are required to start the process of mating the CBM automatically to support the Shuttle 20 minute sep requirement (the second command is the CBM_Confirmation_Command).

Items 21: Above item 21 is the field for the Master Stat Code. This four-character telemetry field tells the user the status of the Master Controller assigned (ie: whether a command is in complete, in progress, pending, aborted, failed, or has timed out.) The addendum Q defines the bit combinations that generate the text fields.

MASK - 'ITEM 21 + XX', the Mask Bolt commands, are indexed item entries. The XX are integers that are: 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, and 45, each correspond to the bolt groups. All other hex entries will result in an 'ILLEGAL ENTRY' message. These commands are defined in addendum 'F' of the keyboard processing table.

These are grouped in a matrix to mask a single or multiple controller failure should that malfunction happen. This is a contingency area on the display which, when a certain actuator is masked, an asterisk is driven at the appropriate X,Y coordinate of the controller/actuator being masked. For example, if an 'ITEM 21+ 22 EXEC' is entered, an asterisk is driven adjacent the vertical column at 2 and under the horizontal column at 2. This command deselects the actuator/controller 2-2. There is a group 5 listed there and these are the latch controller/actuators that can be masked similarly as with the bolts.

The Ready To Latch (RTL) area below is a discrete feedback field on the display to provide the RMS operator with a series of alpha characters 'O' for an Open or 'C' for a Closed indication for each of four latches. The characters indicate whether the CBM is in the capture envelope for the latch that corresponds to that specific RTL. Adjacent to each latch is a pair of stand alone status that (left to right) provide insight to a switch short or an open circuit respectively, in either case if a down arrow is displayed if the event has occurred.

Item 22: CLOSE - the command that mates the active with the passive CBM segment in preparation for the bolt driving process.